

## REFERENCE 2

FAH-09-88

From F. A. Hohorst  
Phone 6-4542/MS 2202  
Date November 2, 1988  
Subject Radiological Residues at the CFSGF Ash Pit as of September 30, 1988

To B. G. Motes, Manager *BGM*  
Effluent & Environmental Analysis

cc: T. W. Chesnovar  
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F. A. Hohorst-2

- Ref: 1) F. A. Hohorst Letter, FAH-20-85, to G. J. McManus, "Interim Report on Radiological Residues from the CFSGF," dated October 21, 1985
- 2) F. A. Hohorst Letter, FAH-6-86, to G. J. McManus, "Second Interim Report on Radiological Residues at the CFSGF," dated March 3, 1986
- 3) F. A. Hohorst Letter, FAH-15-86, to B. G. Motes, "Radiological Residues at the CFSGF Ash Pit as of September 30, 1986," dated October 20, 1986
- 4) F. A. Hohorst Letter, FAH-06-87, to B. G. Motes, "Radiological Residues at the CFSGF Ash Pit as of September 30, 1987," dated October 12, 1987

This letter represents an update on the radiological residues at the Coal Fired Steam Generation Facility (CFSGF) as of September 30, 1988. The CFSGF is a complex southeast of the main ICPP security fence which consists of a 750 by 450 foot enclosure containing several buildings, the principal one being CPP-687. The current ash disposal pit has no facility identification number. It is a 400 by 620 foot area due east of this complex, centered at site coordinates N693292/E298210.

The inventory of radioactivity in residues at the CFSGF ash pit has been the subject of four prior letters (References 1-4). This letter reports FY-88 data and accumulations to date.

The FY-88 supplier for the coal was the same supplier as in FY-87, the U.S. Coal Co., Hiawatha Mine, Price, UT. The supplier of limestone was Montana Limestone Co., formerly Bighorn Calcium Co., Billings, MT. Gamma analyses of samples of both the coal and limestone were reported in Reference 3. Normal concentrations of uranium-235 (0.72% of total uranium) and its progeny were assumed. These data were used in computing the quantities of the radioisotopes potassium-40, thorium-232, and uranium-238 reported in subsequent tables.

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Dumping at the ash pit east of the CFSGF continued, adding a calculated 4340 tons ( $3.94 \times 10^6$  kg) of ash, i.e., limestone residues plus 7.0% coal ash, to the west half of the pit in FY-88. Figure 1 was prepared from an EG&G Idaho high altitude photograph taken on May 11, 1988, at 1036 from an altitude of 15720 foot. It documents physical changes at the ash pit since the previous photograph on May 5, 1987. As can be seen, part of the west side of the pit has been covered with earth as an interim seal. Dumping is proceeding from points further east because trucks can now drive over the interim seal. Water added to the ash to suppress dust drains into the eastern part of the pit. Several patches of discarded concrete about 2 meters in diameter by 0.5 meter thick were also observed.

Using these data and data in References 2 and 3, Tables 1 and 2 were prepared reporting the changes during the year for thorium-232 and uranium-238, respectively. The calculated increase in these radioisotopes was 14 kilograms of thorium-232 and 20 kilograms of uranium-238. Assuming a natural isotopic abundance of uranium-235, its increase was 0.14 kg.

Table 3 summarizes the volumes of coal and limestone used and inventory of ash for FY-88 and their cumulative quantities to date. Coal consumption during FY-88 was 13083 tons ( $1.187 \times 10^7$  kg). Limestone consumption was 3424 tons ( $3.106 \times 10^6$  kg). The total calculated volume of ash in the CFSGF ash pit is 27,500 cubic meters (36,000 cubic yards) as of September 30, 1988. This represents an increase of 5540 cubic meters (7250 cubic yards) since October 1, 1987.

Table 4 summarizes the changes to the inventories of radioisotopes for FY-88 and the quantities to date. The total estimated quantity of radioisotopes in the CFSGF ash pit was 0.51 curie as of September 30, 1988. This represents an increase of 0.11 curie since October 1, 1987. These estimates assume secular equilibrium in the thorium-232, uranium-235, and uranium-238 decay chains.

In summation, the ICPP ash pit is a 255,000 square foot, surface impoundment Solid Waste Management Unit (SWMU) which receives nonhazardous waste, primarily ash resulting from operation of the CFSGF. This SWMU received a calculated total of 4340 tons of solid waste during FY-88. The remaining capacity of this SWMU is 59,000 cubic yards. This SWMU has received a calculated total of 16,600 tons of solid waste since it was first placed in service in 1984.

If you have any questions, please call me.



Frederick A. Hohorst  
Effluent & Environmental Analysis

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Attachments

TABLE 1

FY-88 Mass Increase of Thorium-232 at CFSGF

	<u>Consumed</u> <u>(g)</u>	<u>Assay</u> <u>(Ci g<sup>-1</sup>)</u>	<u>Activity</u> <u>(Ci)</u>
Coal	$1.18 \times 10^{10}$	$1.2 \times 10^{-13}$	$1.4 \times 10^{-3}$
Limestone	$3.07 \times 10^9$	$1.9 \times 10^{-14}$	$5.8 \times 10^{-5}$
<u>Total</u>			
Thorium-232 Calculated = $1.5 \times 10^{-3}$ Ci			
Thorium-232 Calculated = 14 kg			

TABLE 2

FY-88 Mass Increase of Uranium-238 at CFSGF

	<u>Consumed</u> <u>(g)</u>	<u>Assay</u> <u>(Ci g<sup>-1</sup>)</u>	<u>Activity</u> <u>(Ci)</u>
Coal:			
Hiawatha	$1.18 \times 10^{10}$	$4.4 \times 10^{-13}$	$5.2 \times 10^{-3}$
Limestone:			
Bighorn Calcium	$3.07 \times 10^9$	$5.1 \times 10^{-13}$	$1.6 \times 10^{-3}$
<u>Total</u>			
Uranium-238 Calculated = $6.8 \times 10^{-3}$ Ci			
Uranium-238 Calculated = 20 kg			

TABLE 3

FY-88 Coal and Limestone Use and Ash Generated

<u>Item</u>	<u>Units</u>	<u>FY-88</u>	<u>Cumulative On 9/30/88</u>
Coal	Kilograms	11,870,000	48,410,000
Limestone	Kilograms	3,106,000	11,665,000 <sup>a</sup>
Ash	Kilograms	3,937,000	15,054,000 <sup>a</sup>
Ash	Cubic Meters	5,500	27,500

<sup>a</sup>Records of purchases are incomplete prior to FY-85.

TABLE 4

FY-88 Radioisotope Inventory at the CFSGF Ash Pit

<u>Radioisotopes</u>	<u>Units</u>	<u>FY-88</u>	<u>Cumulative On 9/30/88</u>
Potassium-40	Ci	<0.0001	<0.001
Thorium-232 & Progeny	Ci	0.016	0.079
Uranium-235 & Progeny	Ci	0.0037	0.016
Uranium-238 & Progeny	Ci	0.095	0.42
TOTAL	Ci	0.11	0.51

